Amendments to the Claims:

This listing will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:
   a. configuring the first and second surfaces to be in slidable contact with one another along an interface of a contact pad surface between the first surface and the second surface and under a force sufficient to maintain contact and having a static friction therebetween wherein the contact pad is positioned at an anti-nodal region of the first surface; and
   b. inducing a repetitive motion in resonance in the first surface parallel to the interface thereby altering the effective coefficient of friction along the contact pad surface.

2. (Currently Amended) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:
   a. configuring the first and second surfaces to be in slidable contact with one another along an interface of a contact pad surface between the first surface and the second surface and under a force sufficient to maintain contact and having a static friction therebetween wherein the contact pad is positioned at an anti-nodal region of the first surface;; and
   b. inducing a symmetrical motion in resonance in the first surface parallel to the interface thereby altering the effective coefficient of friction along the contact pad surface.

3. (Original) The method according to claim 2 wherein the first element comprises a set of dimensions, the method further comprising the step of varying a desired dimension of the first element in response to an electronic signal.

4. (Original) The method as claimed in claim 3 wherein the step of varying the desired dimension further comprises providing a transducer having the set of dimensions, the transducer converting the electronic signal into microscopic mechanical displacements to generate the symmetrical motion.

5. (Withdrawn) The method according to claim 4 further comprising generating the electronic signal at a predetermined frequency which in turn varies the desired dimension at a corresponding velocity.

6. (Withdrawn) The method as claimed in claim 5 further comprising the step of amplifying the mechanical displacements.

7. (Withdrawn) The method as claimed in claim 6 wherein the step of amplifying further comprises producing a resonance in the transducer to amplify the mechanical displacements by an amplification factor proportional to a quality factor.

8. (Withdrawn) The method as claimed in claim 7 wherein the step of producing the resonance further comprises the steps of:

a. determining a longitudinal acoustic resonant frequency of the transducer along the desired dimension; and
b. generating a frequency of motion in the transducer substantially equal to the resonant frequency.

9. (Withdrawn) The method as claimed in claim 5 further comprising the step of providing at least one extension member having an extension member body, the body being attached to the transducer.

10. (Withdrawn) The method as claimed in claim 9 further comprising the step of transferring the mechanical displacements to the extension member body.

11. (Withdrawn) The method as claimed in claim 10 further comprising the step of making the corresponding velocity proportional to a gain factor of the extension member body.

12. (Withdrawn) The method as claimed in claim 2 further comprising the step of temporally nulling a plurality of frictional forces generated by the symmetrical motion along the interface for at least one oscillation cycle by:

a. maintaining the force to be constant for the cycle;
b. adapting the surfaces to have an actual coefficient of friction substantially uniform along any slidable path; and
c. providing the second element with a substantially large inertial mass.

13. (Withdrawn) The method as claimed in claim 2 further comprising the step of spatially nulling a plurality of frictional forces generated by the symmetrical motion along the interface by

selecting the interface such that at least one frictional force from a region within the interface is opposed by at least one substantially equal and opposite frictional force from another region within the interface.

14. (Original) The method as claimed in claim 2 further comprising the step of reducing an actual coefficient of friction between the first and second surfaces.

15. (Withdrawn) The method as claimed in claim 14 wherein the step of reducing the actual coefficient of friction further comprises adding a lubricant between the first and the second surfaces.

16. (Original) The method as claimed in claim 14 wherein the step of reducing the actual coefficient of friction further comprises applying a thin film of material of a predetermined thickness to at least one of the surfaces.

17. (Original) The method as claimed in claim 16 further comprising the step of modifying the thin film by ion implantation of a predetermined number of ions/cm^2.

18. (Withdrawn) The method as claimed in claim 2 further comprising the step of minimizing bonding between the first and the second surface.

19. (Withdrawn) The method as claimed in claim 18 wherein the step of minimizing the bonding further comprises:

a. polishing at least one surface to a predetermined degree of flatness per unit area;
b. texturing at least one surface to form a series of microscopic recesses in accordance with a controlled and reproducible pattern; and
c. coating at least one surface with an anti-bonding film.

20. (Withdrawn) The method as claimed in claim 18 wherein the step of minimizing the bonding further comprises:

a. limiting a contact pressure between the first and the second surface to be less than 1 MPa;
b. controlling each sliding surface to have a temperature between 00 C and 500 C;
c. generating a frequency of the symmetrical motion of the first element in a range between 0 kHz and 120 kHz; and
d. selecting the frequency of the symmetrical motion to be a longitudinal acoustic resonant frequency of the first element.

21. (Withdrawn) The method as claimed in claim 18 wherein the step of minimizing the bonding further comprises:

a. selecting a melting temperature of a surface material for each of the surfaces to be substantially greater than 1000 C;
b. selecting a crystalline structure of the first surface to be substantially different than a crystalline structure of the second surface; and
c. selecting a thermal conductivity value of at least one surface to be large.

22. (Withdrawn) The method as claimed in claim 2 further comprising the steps of:

a. determining a root-mean-square velocity of the symmetrical motion of the first element as a function along the first surface;
b. determining a maximum root-mean-square velocity of the motion of the first element along the first surface; and
c. selecting a plurality of points in the first surface having the root-mean-square velocity within a predetermined percentage of the maximum root-mean-square velocity such that the selected points are configured to be in slidable contact with the second surface along the interface.

23. (Withdrawn) The method as claimed in claim 2 further comprising the step of initiating a sliding force to at least one element such that the first element and second element move at a translational speed relative to one another.

24. (Withdrawn) The method as claimed in claim 23 further comprising the step of controlling a root-mean-square velocity of the symmetrical motion in the first element to be greater than the translational speed between the elements.

25. (Withdrawn) The method as claimed in claim 2 further comprising the step of controlling a cross section of the first element to a predetermined specification.

26. (Withdrawn) The method as claimed in claim 2 further comprising the steps of

a. changing the force;
b. generating a signal representing the change in force wherein the signal is applied to a feedback mechanism; and
c. controlling a cross section of the first element in response to the signal from the feedback mechanism.

27. (Withdrawn) The method as claimed in claim 22 further comprising adapting one or more contact members to the first element at the selected points wherein the contact member is in

slidable contact with the second surface along the interface.

28. (Withdrawn) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:

a. providing at least two contact points on the first surface;

b. configuring the contact points and the second surface to be in slidable contact with one another along an interface and under a force sufficient to maintain contact and having a static friction therebetween; and

c. energizing the first element to repetitively and alternately expand and contract a physical dimension of the first element such that the contact points move away from and toward one another at a determined velocity and parallel to the interface thereby adjusting the effective coefficient of friction.

29. (Withdrawn) The method according to claim 28 wherein no substantial translational motion is imparted to the second element by energizing the first element.

30. (Withdrawn) The method as claimed in claim 28 wherein the first element further comprises at least one transducer for converting electrical energy into microscopic mechanical displacements to generate the repetitive and alternative expansion and contraction at the determined velocity.

31. (Withdrawn) The method as claimed in claim 30 further comprising an excitation means for generating the electrical energy.

32. (Withdrawn) The method as claimed in claim 28 further comprising attaching at least one extension member to the first element, the extension member having an extension sliding surface and an extension member body with a variable cross section along a dimension of the extension member body.

33. (Withdrawn) The method as claimed in claim 32 further comprising the step of amplifying the repetitive and alternative expansion and contraction of the first element.

34. (Withdrawn) The method as claimed in claim 33 wherein the step of amplifying further comprises producing a resonance in the extension member, wherein the repetitive and alternative expansion and contraction is amplified by an amplification factor proportional to a quality factor of the extension member.

35. (Withdrawn) The method as claimed in claim 34 wherein the step of producing the resonance further comprises the steps of:

a. determining a longitudinal acoustic resonant frequency of the extension member along the dimension of the extension member body; and
b. generating a frequency of motion in the extension member substantially equal to the resonant frequency.

36. (Withdrawn) The method as claimed in claim 35 further comprising the step of transferring the amplified repetitive and alternative expansion and contraction of the first element to the extension sliding surface.

37. (Withdrawn) The method as claimed in claim 32 further comprising the step of making the determined velocity proportional to a gain factor of the extension member body.

38. (Withdrawn) The method as claimed in claim 28 further comprising the step of temporally nulling a plurality of frictional forces generated by the repetitive and alternative expansion and contraction of the first element along the interface for at least one oscillation cycle by:

a. maintaining the force to be constant for the cycle;
b. adapting the surfaces to have an actual coefficient of friction substantially uniform along any slidable path; and
c. providing the second element with a substantially large inertial mass.

39. (Withdrawn) The method as claimed in claim 28 further comprising the step of spatially nulling a plurality of frictional forces generated by the repetitive and alternative expansion and contraction of the first element along the interface by:

a. setting a frequency of the motion of the contact points;
b. setting a phase of the motion of the contact points;
c. setting an amplitude of the motion of the contact points;
d. adapting the surfaces to have an actual coefficient of friction substantially uniform along any slidable path; and
e. selecting a location of the contact points on the first surface such that at least one frictional force from a region within the interface is opposed by at least one substantially equal and opposite frictional force from another region within the interface.

40. (Withdrawn) The method as claimed in claim 39 wherein the steps of setting the phase, frequency, and amplitude for the motion of the contact points further comprise:

a. determining a common resonant frequency, an individual resonant phase, and an individual resonant amplitude for the motion of the contact points resulting from a substantially sinusoidal longitudinal acoustic resonant wave in the first element, whereby a propagation direction of the resonant wave is aligned substantially parallel to the first surface;
b. setting the frequency of the motion to be the resonant frequency;
c. setting the phase to the resonant phase for the point; and
d. setting the amplitude to the resonant amplitude for the point.

41. (Withdrawn) The method as claimed in claim 28 further comprising the step of reducing an actual coefficient of friction between a contact point surface of the contact points and the second surface.

42. (Withdrawn) The method as claimed in claim 41 wherein the step of reducing the actual coefficient of friction further comprises adding a lubricant between the contact point surface and the second surface.

43. (Withdrawn) The method as claimed in claim 41 wherein the step of reducing the actual coefficient of friction further comprises applying a thin film of material of a predetermined thickness to at least one of the surfaces.

44. (Withdrawn) The method as claimed in claim 43 further comprising the step of modifying the thin film by ion implantation of a predetermined number of ions/cm^2.

45. (Withdrawn) The method as claimed in claim 28 further comprising the step of minimizing bonding between a contact point surface of the contact points and the second surface.

46. (Withdrawn) The method as claimed in claim 45 wherein the step of minimizing the bonding further comprises:

a. polishing the surfaces to a predetermined degree of flatness per unit area;
b. texturing the surfaces to form a series of microscopic recesses in accordance with a controlled and reproducible pattern; and
c. coating the surfaces with an anti-bonding film.

47. (Withdrawn) The method as claimed in claim 45 wherein the step of minimizing the bonding further comprises:

a. limiting a contact pressure between the contact point surface and the second surface to be less than 1 MPa;

b. controlling the contact point surface and the second surface to have a temperature between 00 C and 500 C;
c. generating a frequency of the repetitive and alternative expansion and contraction of the first element to be in a range between 0 kHz and 120 kHz; and
d. selecting the frequency of the repetitive and alternative expansion and contraction of the first element to be a longitudinal acoustic resonant frequency.

48. (Withdrawn) The method as claimed in claim 45 wherein the step of minimizing the bonding further compnses:
a. selecting a melting temperature of a surface material for the second surface to be substantially greater than 10000 C;
b. selecting a crystalline structure of the contact point surface to be substantially different than a crystalline structure of the second surface; and
c. selecting a thermal conductivity value of at least one of the surfaces to be large.

49. (Withdrawn) The method as claimed in claim 28 wherein configuring the contact points further comprises the steps of:
a. determining a root-mean-square velocity of the repetitive and alterative expansion and contraction of the first element as a function along the first surface;
b. determining a maximum root-mean-square velocity of the repetitive and alternative expansion and contraction of the first element along the first surface; and
c. placing the contact points to a portion of the first surface having the root-mean-square velocity within a predetermined percentage of the maximum root-mean-square velocity.

50. (Withdrawn) The method as claimed in claim 28 further comprising the step of initiating a sliding force to at least one element such that the first element and second element move at a translational speed relative to one another.

51. (Withdrawn) The method as claimed in claim 50 further comprising controlling a root-mean-square velocity of the repetitive and alternative expansion and contraction of the first element to be greater than the translational speed between the elements.

52. (Withdrawn) The method as claimed in claim 28 further comprising the step of controlling a cross section of the first element to a predetermined specification.

53. (Withdrawn) The method as claimed in claim 28 further comprising the steps of:

a. changing the force;

b. generating a signal representing the change wherein the signal is applied to a feedback mechanism; and

c. controlling a cross section along the first element in response to the signal from the feedback mechanism.

54 - 131. (Cancelled)

132. (Withdrawn) A method of controlling an effective coefficient of friction between a first surface of a
first element and a second surface of a second element, the method comprising the steps
of:

a. providing a contact point on the first surface;

b. configuring the contact point and the second surface to be in slidable contact with one another along an interface and under a force sufficient to maintain contact and having a static friction therebetween;

c. energizing the first element to produce a repetitive motion of the contact point such that the effective coefficient of friction is altered; and

d. determining a change in applied power required for producing the motion as a result of a variation in the force.

133. (Withdrawn) The method as claimed in claim 132 wherein the first element further comprises at least one transducer for converting electrical energy into microscopic mechanical displacement.

134. (Withdrawn) The method as claimed in claim 133 further including the step of utilizing an excitation means for generating the electrical energy.

135. (Withdrawn) The method as claimed in claim 132 further including the step of controlling a root-mean-square velocity of the motion at a predetermined specification.

136. (Withdrawn) The method as claimed in claim 132 wherein the step of determining the change in applied power comprises:

a. determining an initial level of the applied power required for inducing the motion before the variation;

b. determining a final level of the applied power required for inducing the motion after the variation; and

c. calculating a difference between the final level and the initial level.

137. (Withdrawn) The method as claimed in claim 132 further including the step of generating a signal which represents the variation in the force, the signal being applied to an output device.

138. (Withdrawn) The method as claimed in claim 137 wherein the output device is a feedback mechanism.

139. (Withdrawn) The method as claimed in claim 132 further comprising a step of suppressing a plurality of side effects, wherein the side effects further comprise bond formation between the contact point and second surface that prevents relative movement therebetween.

140. (Withdrawn) The method as claimed in claim 132 further comprising a step of suppressing a plurality of side effects, wherein the side effects further comprise at least one translational force inbetween the surfaces.

141. (Withdrawn) A method of assembling an ultrastiff precision sonic bearing, comprising:

a. providing a load member having a load accepting surface and a load sliding surface;
b. providing a bearing element having a bearing support region and a bearing sliding surface;
c. coupling the bearing element with the load member, wherein the load sliding surface is in slidable contact along a slidable path with the bearing sliding surface, the load sliding surface and the bearing sliding surface having a coefficient of friction therebetween; and
d. generating a substantially oscillatory sliding motion in the bearing element, the oscillatory sliding motion having an oscillation path tangent with the slidable path for an interacting point between the load sliding surface and the bearing sliding surface.

142. (Withdrawn) A method of assembling an ultrastiff sonic bearing, comprising:

a. providing a bearing element having a bearing body of a controllable variable static stiffness and a controllable variable dynamic stiffness, the bearing element including a bearing sliding surface and a bearing support region;
b. providing a base member having a base sliding region, the base sliding region being disposed in contact with the bearing support region;
c. coupling the bearing element with a load member having a load sliding surface, wherein the bearing sliding surface and the load sliding surface are in continuous slidable contact by a force for sliding the load member along a slidable path; and

d. converting electrical energy into microscopic mechanical displacement in the bearing element, the displacement for inducing a substantially oscillatory sliding motion having an oscillation path along the slidable path.

143. (Currently Amended) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:

a. configuring the first and second surfaces to be in slidable contact with one another along an interface between the first surface and the second surface, wherein the interface is located only along an anti-nodal region of the first element, the first and second surfaces under a force sufficient to maintain contact at the interface and having a static friction therebetween; and

b. inducing a repetitive motion in resonance in the first surface parallel to the interface thereby altering the effective coefficient of friction.

144. (Currently Amended) A method of controlling an effective coefficient of friction between a first surface of a first element and a second surface of a second element, the method comprising the steps of:

a. inducing a repetitive motion in resonance in the first surface parallel to an interface thereby altering the effective coefficient of friction;

b. configuring the first and second surfaces to be in slidable contact with one another along an anti-nodal region of the interface wherein the first surface protrudes from the first element an appropriate distance such that no motion perpendicular to the second surface is imparted to the second surface~~; and~~

~~b. inducing a repetitive motion in the first surface parallel to the interface thereby altering the effective coefficient of friction, wherein the static friction force is unaltered~~.